

### **REMARKS**

Reconsideration of the application is respectfully requested in view of the foregoing amendments and following remarks. Claims 1-24 are pending in the application. No claims have been allowed. Claims 1, 12, 15, 21, and 24 are independent.

### ***Specification***

The specification has been amended to correct a minor error in referring to Figures 2A, 2B and 2C. The amendment adds no new matter.

### ***Cited Art***

U.S. Patent No. 4,581,712 to Perry et al. ("Perry") is entitled "Roof Pressure Monitoring System."

U.S. Patent No. 5,541,788 to Stankus et al. ("Stankus") is entitled "Method and Apparatus for Monitoring Mine Roof Support Systems."

U.S. Patent No. 4,480,480 to Scott et al. ("Scott") is entitled "System for Assessing the Integrity of Structural Systems."

U.S. Patent No. 4,887,935 to Koppers et al. ("Koppers") is entitled "Method of Controlling the Movement of a Longwall Excavation Front, Especially the Face or Breast of a Coal Seam."

### ***Patentability of Claims 1-8, 11-13, 15-17, and 21 over Perry in view of Stankus under § 103***

The Action rejects claims 1-8, 11-13, 15-17, and 21 under 35 U.S.C. § 103(a) as unpatentable over Perry in view of Stankus. Applicants respectfully submit the claims in their present form are allowable over the cited art. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (MPEP § 2142.) Motivations to combine or modify

references must come from the references themselves or be within the body of knowledge in the art. (See MPEP § 2143.01.)

*Claim 1*

As amended, claim 1 is directed to an apparatus for monitoring the dynamic loading rate on support systems used in an underground mine and recites in part:

a plurality of sensory indicators ... controlled by said programmable controller to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems during mining operations on a real-time basis.

Additionally, Applicants have amended claim 1 to further specify that the sensory indicators are “located in the vicinity of said at least one load sensing device.”

*Perry’s description of a printer at a remote position fails to teach or suggest “a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller,” as recited in claim 1.* In its rejection of claim 1, the Action relies on various passages in Perry for the proposition that Perry “teaches the act of reporting real-time analysis on the sensed data through a printer.” The Office Action then states at page 4 that:

it would be obvious to one having ordinary skill in the art at the time the invention was made to modify the Perry real-time warning indications by substituting said printer by alarm indicators in order to report data analysis output and warning signals directly to miners through the use of sensor indicators for any on-going development of dangerous mine conditions or damage to the equipment within the mine.

Applicants respectfully disagree; the Action does not provide a citation to a passage in Perry for such a modification. Perry does describe a roof pressure monitoring system wherein “[w]hen a substantial change is detected in a sensor, the host computer not only logs the new information, but it prints a hard copy report on a printer 24 which includes a complete history of the change for that sensor and its associated bolt or support.” However, Perry makes very clear that the host computer and connected printer are “located in a *remote position*, such as the mine office.” (col. 2, lines 59-60). Therefore, Perry lacks sufficient disclosure to teach or suggest the recited arrangement.

*Perry’s description of a printer at a remote position would not lead one to “alert miners . . . during mining operations on a real-time basis,” as recited in claim 1.* Perry’s printer, which

is located in a remote location such as a mine office could not function to provide an alert to miners during mining operations on a real-time basis. For example, upon activation of the printer, additional steps would have to be taken by mine office personnel to alert miners. Further, even if the printer were moved into the mine, it is questionable that miners would be alerted during mining operations by a printer.

For at least these reasons, Perry lacks sufficient disclosure to teach or suggest the recited arrangement.

*Stankus' description of stress meters, convergence meters, load cells and strain gages fails to mention a programmable controller and thus offers insufficient guidance for how to modify Perry to result in the claimed, "plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller."* Stankus describes the use of stress and convergence meters, load cells and strain gages. However, these are devices are load sensing devices and are not controlled by a programmable controller. For instance, Stankus describes a suitable stress meter as a "vibrating wire stress meter" which is "installed in horizontal holes drilled approximately twenty-five feet into the panel and fifteen feet into a yield panel." See column 15, line 65 - column 16, line 4. However, Stankus does not suggest controlling these devices with a programmable controller.

Because Stankus fails to even mention a programmable controller, a skilled artisan constructing a system with sensory indicators controlled by a programmable controller would not look to Stankus for guidance. Further, even if consulted, Stankus does not describe controlling by a programmable controller. Thus, Stankus' description of meters and gages to measure load pressure, either alone or in combination with Perry, would not teach or suggest, "a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller," as recited in claim 1.

In conclusion, the cited references, either alone or in combination, fail to describe at least one element recited in claim 1. Additionally, the Office Action does not cite, as the references do not contain, sufficient motivation to modify or combine the references to result in the claimed combination. Therefore, claim 1 as amended is not subject to a 103(a) rejection and Applicants request the objection be withdrawn. Claims 2-11, which depend from claim 1, are allowable for similar reasons, as well as the respective additional features recited therein.

*Claim 12*

Claim 12 has been amended to recite “sensory warning indicators located in the vicinity of said at least one load sensing device responsive to said determining means.” Perry in combination with Stankus fails to teach or suggest such an arrangement.

For at least these reasons, claim 12 and its dependent claims, 13-14 and 22, are allowable.

*Claim 15*

Claim 15 has been amended to recite “determining the load rate . . . ; and activating sensory warning indicators located in the vicinity of said at least one load sensing device to provide timely warning indications.”

Perry in combination with Stankus fails to teach or suggest such an arrangement.

For at least these reasons, claim 15 and its dependent claims, 16-20 and 23, are allowable over Perry and Stankus.

*Claim 21*

As amended, claim 21 is directed to a method of monitoring the dynamic loading rate on support systems used in an underground mine and recites in part,

at least one sensory indicator, located in the vicinity of said at least one load sensing device, controlled by said programmable controller to provide timely warning indications used as an aid in determining when to install additional support systems and alert workers of dangerous loading conditions on the support systems on a real-time basis.

*Perry's description of a printer at a remote position fails to teach or suggest “at least one sensory indicator, located in the vicinity of said at least one load sensing device, controlled by said programmable controller,” as recited in claim 21.* Perry makes very clear that the host computer and connected printer are “located in a remote position, such as the mine office.” (col. 2, lines 59-60). Therefore, not only does Perry not teach or suggest, “at least one sensory indicator, located in the vicinity of said at least one load sensing device, controlled by said programmable controller,” as recited in claim 21, but Perry directly teaches away from this feature.

*Stankus' description of stress meters, convergence meters, load cells and strain gages fails to mention a programmable controller and thus offers insufficient guidance for how to*

*modify Perry to result in the claimed, "at least one sensory indicator, located in the vicinity of said at least one load sensing device, controlled by said programmable controller."* Stankus' description of meters and gages to measure load pressure are not controlled by a programmable controller and therefore offers insufficient motivation to one of skill in the art to modify Perry to arrive at the claimed, "at least one sensory indicator, located in the vicinity of said at least one load sensing device, controlled by said programmable controller," as recited in claim 21.

Since the cited references, either alone or in combination, fail to describe at least one element recited in claim 21, and the references do not contain sufficient motivation to modify the references, claim 21 as amended is not subject to a 103(a) rejection and Applicants request the objection be withdrawn.

***Patentability of Claims 9-10, 14, 18 and 20 over Perry in view of Stankus and further in view of Scott under § 103***

The Action rejects claims 9-10, 14, 18 and 20 over Perry in view of Stankus and further in view of Scott. Applicants respectfully submit the claims in their present form are allowable over the cited art.

***Claims 9-10***

Claims 9 and 10 depend from claim 1, which as amended, is directed to an apparatus for monitoring the dynamic loading rate on support systems used in an underground mine and recites in part,

a plurality of sensory indicators ... controlled by said programmable controller to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems during mining operations on a real-time basis.

Additionally, Applicants have amended claim 1 to further specify that the sensory indicators are "located in the vicinity of said at least one load sensing device."

As discussed previously with respect to claim 1 above, Perry and Stankus, whether considered alone or in combination, fail to teach or suggest "a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller," as recited in claim 1, and therefore claims 9 and 10.

*Scott's description of a structural moment detector (SMD) fails to mention any method of monitoring load rates on support systems in a mining environment and thus offers insufficient guidance for how to modify Perry to result in the claimed, "plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller."* Scott describes a SMD "for collecting and interpreting data reflecting the effect of at least a selected one of a plurality of forces acting on a structure." (See col. 2, lines 15-17). The data "may optionally be transmitted to data display equipment 52 which provides visual display of the acquired data." (See col. 2, lines 44-47).

For instance, the Office Action cites col. 18, lines 44-63 and col. 30, lines 26-36 of Scott. Col. 18 of Scott does state:

[w]ith the development of the SMD and associated electronics and processing techniques, it is now possible to provide a real time assessment of the ability of a structure to handle the load it is experiencing and provide an active indication of when this capability has changed.

However, the Scott passage still fails to teach or suggest "in the vicinity of said at least one load sensing device" or "alert miners of dangerous loading conditions . . . during mining operations." Therefore, the mere mention of real time assessment of load capability would not teach or suggest to one of skill in the art "a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller."

Col. 30 of Scott refers to the use of the SMD on a crane as illustrated in Scott's Figures 36-38. Measurements from the SMD are collected and "[t]he information is then presented as a visual display and/or recorded and analyzed to provide a knowledge of the current loading of the crane ... This information is used both as a primary source for real-time control of loading operations and for safety verification prevention of overloads." The Office Action does not indicate, and Applicant cannot find, any statement in Scott that would motivate one of skill in the art to modify its description of using an SMD on a crane such that it is applicable to mining operations. Thus, a skilled artisan would not look to Scott's description of a SMD for guidance in modifying a Perry-Stankus combination to arrive at "a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems during mining operations on a real-time basis."

Since the references, either alone or in combination, fail to describe at least one element recited in claim 1 from which claims 9 and 10 depend, and the references do not contain any motivation to modify or combine the references, claims 9 and 10 are not subject to a 103(a) rejection and Applicants request the rejections be withdrawn.

*Claims 14, 18, and 20*

Claims 14, 18, and 20 also include the “in the vicinity of said at least one load sensing device” language.

For at least these reasons, claims 14, 18, and 20 are allowable over a Perry-Stankus-Scott combination.

***Patentability of Claim 19 over Perry in  
view of Stankus and further in view of Koppers under § 103***

The Action rejects claim 19 over Perry in view of Stankus and further in view of Koppers. Applicants respectfully submit the claim in its present form is allowable over the cited art.

*Claim 19*

Claim 19 depends from claim 15, which as amended, is directed to a method of monitoring the dynamic loading rate on support systems used in an underground mine and recites in part,

activating sensory warning indicators, located in the vicinity of said at least one load sensing device, to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems during mining operations on a real-time basis.

As discussed previously with respect to claim 15 above, Perry and Stankus, whether considered alone or in combination, fail to teach or suggest “activating sensory warning indicators, located in the vicinity of said at least one load sensing device, to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems,” as recited in claim 15, and therefore claim 19.

*Koppers also fails to teach or suggest "activating sensory warning indicators, located in the vicinity of said at least one load sensing device, to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems."* Koppers describes a system for automatically advancing conveyer elements and drawing props using a computer to control the advance of a mining front in longwall mining. Applicants do not understand Koppers as teaching or suggesting the recited sensory warning indicators as claimed. Thus, the combination of Koppers, Perry and Stankus, also fails to teach or suggest "activating sensory warning indicators, located in the vicinity of said at least one load sensing device, to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems."

Since the cited references, either alone or in combination, fail to describe at least one element recited in claim 15 from which claims 19 depends, and the references do not contain sufficient motivation to modify what is described to result in the claimed arrangement, claim 19 is not subject to a 103(a) rejection and Applicants request the objection be withdrawn.

#### ***New Independent Claim 24***

New independent claim 24 recites "in the vicinity of said at least one load sensing device" and "controlled by said programmable controller." Claim 24 is therefore allowable over the references.

#### ***Dependent Claims***

The dependent claims recite additional, patentably-distinct subject matter not taught or suggested by the references. Without belaboring the language of the individual claims, Applicants note that the dependent claims are separately allowable over the references.

#### ***Request For Interview***

If any issues remain, the Examiner is formally requested to contact the undersigned attorney prior to issuance of the next Office Action in order to arrange a telephonic interview. It is believed that a brief discussion of the merits of the present application may expedite



prosecution. Applicants submit the foregoing formal Amendment so that the Examiner may fully evaluate Applicants' position, thereby enabling the interview to be more focused.

This request is being submitted under MPEP § 713.01, which indicates that an interview may be arranged in advance by a written request.

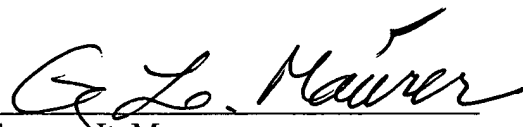
***Conclusion***

The claims in their present form should now be allowable. Such action is respectfully requested.

Respectfully submitted,

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